**Task 00: Execute provided code**

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\* CPE 403 - LAB 3

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\* Program that will show how to initialize the clock system and the GPIO

\* peripheral using

\* TivaWare. It will use the GPIO output to blink an LED

\* on the evaluation board.

\*

\* main.c

\*/

**#include** <stdint.h> //variable definitions for the C99 standard

**#include** <stdbool.h> //boolean definitions for the C99 standard

**#include** "inc/hw\_memmap.h" //macros defining the memory map of the TivaC

**#include** "inc/hw\_types.h" //defines common types and macros

**#include** "driverlib/sysctl.h" //defines and macros for System Control API

**#include** "driverlib/gpio.h" //Defines and macros for GPIO API of DriverLib

uint8\_t ui8PinData=2; //creates an integer variable called ui8PinData

//and initializes it to 2.

**int** **main**(**void**)

{

//sets clock: xtal= 16MHz, 400MHz PLL divided by 10

**SysCtlClockSet**(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

//enable the clock for peripheral

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_GPIOF);

//configures the three GPIO pins connected to the LEDs

**GPIOPinTypeGPIOOutput**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

**while**(1)

{

//turn on LED as specified in ui8PinData

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2| GPIO\_PIN\_3, ui8PinData);

**SysCtlDelay**(2000000); //loop timer provided in TivaWare

//turn LEDs off

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

**SysCtlDelay**(2000000); //delay = 200000\*3 = 6000000 CPU cycles

//set ui8PinData to the next LED color

**if**(ui8PinData==8) {ui8PinData=2;} **else** {ui8PinData=ui8PinData\*2;}

}

}

**Task 01: Determine the current period and on-time of the LED blinking. Change the delay of the LED blink (approx. 0.333 sec) – determine the CLK frequency – verify delay to be approx., 0.333 sec.**

**#include** <stdint.h> //variable definitions for the C99 standard

**#include** <stdbool.h> //boolean definitions for the C99 standard

**#include** "inc/hw\_memmap.h" //macros defining the memory map of the TivaC

**#include** "inc/hw\_types.h" //defines common types and macros

**#include** "driverlib/sysctl.h" //defines and macros for System Control API

**#include** "driverlib/gpio.h" //Defines and macros for GPIO API of DriverLib

uint8\_t ui8PinData=2; //creates an integer variable called ui8PinData

//and initializes it to 2.

**int** **main**(**void**)

{

//2000000\*3 CPU cycles = 6000000 CPU cycles

//6000000/frequency = 0.333sec -> frequency = 6000000/0.333sec = 18.18MHz

//400MHz PLL divided by 22

**SysCtlClockSet**(SYSCTL\_SYSDIV\_11|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

//enable the clock for peripheral

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_GPIOF);

//configures the three GPIO pins connected to the LEDs

**GPIOPinTypeGPIOOutput**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

**while**(1)

{

//turn on LED as specified in ui8PinData

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2| GPIO\_PIN\_3, ui8PinData);

**SysCtlDelay**(2000000); //loop timer provided in TivaWare

//turn LEDs off

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

**SysCtlDelay**(2000000); //delay = 200000\*3 = 6000000 CPU cycles

//set ui8PinData to the next LED color

**if**(ui8PinData==8) {ui8PinData=2;} **else** {ui8PinData=ui8PinData\*2;}

}

}

**Task 02: a) Change the sequence of LED blinking**

**#include** <stdint.h> //variable definitions for the C99 standard

**#include** <stdbool.h> //boolean definitions for the C99 standard

**#include** "inc/hw\_memmap.h" //macros defining the memory map of the TivaC

**#include** "inc/hw\_types.h" //defines common types and macros

**#include** "driverlib/sysctl.h" //defines and macros for System Control API

**#include** "driverlib/gpio.h" //Defines and macros for GPIO API of DriverLib

uint8\_t ui8PinData=8; //creates an integer variable called ui8PinData

//and initializes it to 2.

**int** **main**(**void**)

{

//2000000\*3 CPU cycles = 6000000 CPU cycles

//6000000/frequency = 0.333sec -> frequency = 6000000/0.333sec = 18.18MHz

//400MHz PLL divided by 22

**SysCtlClockSet**(SYSCTL\_SYSDIV\_11|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

//enable the clock for peripheral

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_GPIOF);

//configures the three GPIO pins connected to the LEDs

**GPIOPinTypeGPIOOutput**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

**while**(1)

{

//turn on LED as specified in ui8PinData

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2| GPIO\_PIN\_3, ui8PinData);

**SysCtlDelay**(2000000); //loop timer provided in TivaWare

//turn LEDs off

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

**SysCtlDelay**(2000000); //delay = 200000\*3 = 6000000 CPU cycles

//set ui8PinData to the next LED color

**if**(ui8PinData==2) {ui8PinData=8;} **else** {ui8PinData=ui8PinData/2;}

}

}

**Task 02: b) Blink two LED at an instance and with a sequence**

**#include** <stdint.h> //variable definitions for the C99 standard

**#include** <stdbool.h> //boolean definitions for the C99 standard

**#include** "inc/hw\_memmap.h" //macros defining the memory map of the TivaC

**#include** "inc/hw\_types.h" //defines common types and macros

**#include** "driverlib/sysctl.h" //defines and macros for System Control API

**#include** "driverlib/gpio.h" //Defines and macros for GPIO API of DriverLib

uint8\_t ui8PinData=6; //creates an integer variable called ui8PinData

//and initializes it to 2.

**int** **main**(**void**)

{

//2000000\*3 CPU cycles = 6000000 CPU cycles

//6000000/frequency = 0.333sec -> frequency = 6000000/0.333sec = 18.18MHz

//400MHz PLL divided by 22

**SysCtlClockSet**(SYSCTL\_SYSDIV\_11|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

//enable the clock for peripheral

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_GPIOF);

//configures the three GPIO pins connected to the LEDs

**GPIOPinTypeGPIOOutput**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

**while**(1)

{

//turn on LED as specified in ui8PinData

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2| GPIO\_PIN\_3, ui8PinData);

**SysCtlDelay**(2000000); //loop timer provided in TivaWare

//turn LEDs off

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

**SysCtlDelay**(2000000); //delay = 200000\*3 = 6000000 CPU cycles

//set ui8PinData to the next LED color

**if**(ui8PinData==6) {ui8PinData=10;} //0110 (red+blue=purple)

**else** **if**(ui8PinData==10) //1010 (green+red=yellow)

{ui8PinData=12;}

**else** {ui8PinData=6;} //1100 (blue+green=aqua)

}

}